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09/660,439	09/12/2000	Toshiyuki Takemori	001155	6603

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EXAMINER

RAO, SHRINIVAS H

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 04/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

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# Office Action Summary

Application No.

09/660,439

Applicant(s)

TAKEMORI ET AL.

Examiner

Steven H. Rao

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 12-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-15 are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 and 5. 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Priority***

Receipt is acknowledged of paper submitted under 35 U.S.C.119(a)-(d), claiming priority from Japanese Patent Application No. 11-258687 filed on September 13, 1999 which papers have been placed of record in the file.

### ***Election/Restrictions***

Applicant's election without traverse of claims 1-11 in Paper No. 6 is acknowledged. Claims 12-15 are withdrawn from further consideration.

### ***Information Disclosure Statement***

Acknowledgment is made of receipt of Applicant's Information Disclosure Statement (PTO-1449) filled .

The references on PTO 1499 submitted on 10/19/200 and 2/12/2002 are acknowledged. All the cited references have been considered.

However the foreign patents and documents cited by applicant are considered to the extent that could be understood from the abstract and drawings.

The PTO-1449s have been initialed indicating that the references have been considered and the contract employees have been instructed to mail a copy of the initialed 1449 along with this Office Action.

Claims are examined by examiner as best understood.

### ***Claim Rejections - 35 USC § 112***

**The following is a quotation of the second paragraph of 35 U.S.C. 112:**

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-11 are rejected under 35 U.S.C.112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1 the phrase "oppositely conductive region" renders the claim indefinite because the term "oppositely conductive region " is not clear whether it is referring to the opposite conductive type or a conductive region that is physically located opposite to the reference layer, etc. and "inner circumferential surface" , "tight contact" are all not clear.

In claim 2, the phrase, " .a drain electrode film formed o a surface of said semiconductor layer opposite to said drain layer is not clear.

In claims 6 and 7, the term "inclusive" at the end is not clear.

In claim 10, the phrase as opposed to said drain layer" is not clear.

In claim 11 ,the phrases " the source is provided in the opposite conductivity region" and some how " exposed on an inner circumferential surface of the trench" are not clear.

In claim 11, "circumferential surface" is not clear, " tight contact" is not clear .

The dependent claims are rejected at least for depending directly or indirectly upon rejected independent claims.

Applicants' cooperation is sought to correct the claims that are replete with errors some of which are listed above.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-11, to the extent understood, are rejected under 35 U.S.C. 102(e) as being anticipated by Baliga (U.S Patent No. 5,998,833, herein after Baliga)..

With respect to claim 1, to the extent understood, Baliga describes a transistor including : a semiconductor substrate having a semiconductor layer ( Fig. 2 , col. 3 line 7), a drain layer provided on the semiconductor layer ( fig.2 # 114, col. 3 line 7), and an oppositely conductive region of a second conductivity type provided on the drain layer (

fig.2 # 112 , col. 3 lines 12-15) and a trench extending from a surface of the opposite conductivity region to the drain region ( fig.2 # area bounded by 120 a and 120b, col. 3 lines 33-40), a source region of the first conductivity type provided in the oppositely conductive region and exposed on an inner circumferential surface of the trench ( fig.2 #126 or fig. 3 # 128a, col. 3 line 39 and col. 7 line 41-42), a gate insulating film provided on the inner circumferential surface and inner bottom surface of the trench such that it reaches to the drain layer, the oppositely conductive region and the source region. (fig. 2 # 124, col. 3 line 41 and fig. 3 # 125 col. 7 line 60-61), a gate electrode material provided in tight contact with the gate insulating film ( fig. 2 # 126 in contact with 124, col. 3 lines 37-40 and fig. 3 # 128 a in contact with 125, col. 7 lines 40-45), a source electrode film provided in contact with at least the source region exposed on the inner circumferential surface of the trench and electrically insulated from the gate electrode material ( fig.2 # 118 col. 3 lines 45-50 and fig. 3 # 128b col. 6 lines 51-56).

With respect to claim 2, to the extent understood, wherein a drain electrode formed on a surface of the semiconductor layer opposite the drain layer ( fig. 2,3 # 116 , col. 3 line 47 and col. 7 lines 1-10).

With respect to claim 3, to the extent understood, wherein the impurity concentration of the semiconductor layer is higher than the impurity concentration of the drain layer ( col. 8 line 65 to col. 9 line 21).

With respect to claims 4 to 7, to the extent understood, wherein the insulating material thicker than the gate insulating film is provided between the gate electrode material in the trench and the source electrode film. ( figs. 4H # 30, col. 10 lines 10-14),

said source region being substantially square when viewed from a direction parallel to said side surface of the trench. ( above figures region-18 is substantially square when viewed from a direction parallel to said side surface of said trench).

Claims 2,6,7 and 10 have minor changes to put them in correct English.

With respect to claims 16 and 18 , to the extent understood, it repeats the elements of claims 1 and 11 and adds that the transistor comprises a plurality of source regions (Baliga figs. 4C-K, col. 9 lines 25-26) is rejected for reasons stated above and incorporated here by reference.

With respect to claims 17 and 19 , assuming arguendo, that it contains no new matter, wherein the when each of the source regions is annular when viewed from a direction parallel to said side surface of said trench. (Sapp fig.2 col. 3 lines 58-62).

### ***Response to Arguments***

Applicant's arguments filed 7/15/02 have been fully considered but they are not persuasive for the following reasons. :

Applicants' argue that Baliga is not concerned with the increase in the contact area between a source region and a source electrode film by increasing the area of the source region exposed on the inner circumferential or side surface of the trench.

It is noted that the above limitation is not recited in any of the pending claims and is therefore not given patentable weight.

It is well settled law, " limitations in the specification not included in the claim need not be relied upon to impart patentability to an otherwise unpatentable claim. In re Lundberg, 113 USPQ 530 ( CCPA 1957).

Applicant's arguments with respect to claims 1-11 are also moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Rao whose telephone number is (703) 3065945. The examiner can normally be reached on 8.00 to 5.00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaudhuri Olik can be reached on (703)3062794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 7463926 for regular communications and (703) 872-9319 for After Final communications.


Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 3067722.



Steven H. Rao

Patent Examiner

September 11, 2002



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